

Application Serial No. 10/525,787
 Reply to Office Action of November 21, 2006

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 Docket: CU-4099

Amendments to the Claims

The listing of claims presented below replaces all prior versions, and listings, of claims in the application.

Listing of claims:

1. (currently amended) An antislip regulation and an antilock braking system for a vehicle equipped with a braking system comprising at least one or more brake cylinders ~~(100, 200, 300, 400)~~ each cylinder associated with one or more wheels, a source of fluid under pressure ~~[(10)]~~, ~~[[and]]~~ a brake control ~~[(14)]~~ adapted to be operated to effect braking by feeding said cylinders with fluid under pressure via at least one or more brake valves valve and at least one or more brake pipes ~~(44, 46)~~ brake pipe,
 which system is characterized in that it includes a function selector ~~(50; 150)~~ adapted to adopt an antislip mode position ~~(50A; 150A)~~ in which ~~[[it]]~~ said selector connects a branch pipe ~~(52; 152, 153)~~ to a fluid feed pipe ~~[(54)]~~ and an antilock mode position ~~(50B; 150B)~~ in which ~~[[it]]~~ said selector connects a branch pipe ~~(52; 152, 153)~~ to a return line ~~[(56)]~~, a control valve ~~(110, 210, 310, 410; 510, 610, 710, 810)~~ for the ~~brake cylinder or each brake cylinder (100, 200, 300, 400)~~ of said at least one brake cylinders adapted to adopt a normal braking position ~~(100A, 210A, 310A, 410A; 510A, 610A, 710A, 810A)~~ in which ~~[[it]]~~ said control valve connects the cylinder to the brake pipe ~~(44, 46)~~ and at least one or more special mode positions ~~(110B, 210B, 310B, 410B; 510B, 510C; 610B, 610C; 710B, 710C; 810B, 810C)~~ position in which ~~[[it]]~~ said control valve connects the cylinder to a branch pipe ~~(52; 152, 153)~~ connected either to the return line or to the fluid feed pipe, according to the position of the function selector, and means ~~(120, 220, 320, 420, 4C)~~ for detecting wheelspin or a wheel tending to lock and for ~~commanding~~ controlling in consequence thereof at least the control valve ~~associated with~~ for the brake cylinder associated with that wheel, and ~~in that~~ the control valve ~~(110, 210, 310, 410, 510, 610, 710, 810)~~ of the ~~brake cylinder or of each brake cylinder~~ is for the each of said at least one brake cylinder being a progressive valve such that, when the function selector ~~(50; 150)~~ is in ~~[[its]]~~ the antislip mode position thereof, operation of the control valve modulates a braking force to control wheelspin and, when the function selector ~~(50; 150)~~ is in ~~[[its]]~~ the antilock mode position thereof, operation of the control valve modulates the releasing of the braking of a wheel.

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2. (currently amended) A system according to as claimed in claim 1, characterized ~~in that wherein~~ the function selector ~~[[50]]~~ comprises a feed channel ~~[[51A]]~~ connected to the fluid feed pipe ~~[[54]]~~, a return channel ~~[[51B]]~~, and an outlet channel ~~[[51C]]~~ connected to the branch pipe ~~[[52]]~~, ~~in that the control valve (110, 210, 310, 410) for each brake cylinder comprises of said at least one brake cylinders comprising~~ a channel (111A) connected to the cylinder, a channel (111B) connected to the brake pipe (44, 46), and a channel (111C) connected to the branch pipe ~~[[52]]~~, and ~~in that wherein~~, in the antilock mode position ~~[[50B]]~~ of the selector ~~[[50]]~~, the return channel ~~[[51B]]~~ and the outlet channel ~~[[51C]]~~ are connected together and the feed channel ~~[[51A]]~~ is isolated from them, in the antislip mode position ~~[[50A]]~~ of the selector ~~[[50]]~~, the feed channel ~~[[51A]]~~ and the outlet channel ~~[[51C]]~~ are connected together and the return channel ~~[[51B]]~~ is isolated from them, in the normal braking position (110A, 210A, 310A, 410) of the control valve (110, 210, 310, 410), the channel (111A) connected to the cylinder and the channel (111B) connected to the brake pipe (44, 46) are connected together and the channel connected (111C) to the branch pipe ~~[[52]]~~ is isolated from them, and, in the special mode position (110B) of the control valve (1110, 210, 310, 410), the channel (111A) connected to the cylinder (100, 200, 300, 400) and the channel (111C) connected to the branch pipe are connected together and the channel (111B) connected to the brake pipe (44, 46) is isolated from them.

3. (currently amended) A system according to as claimed in claim 1, characterized ~~in that wherein~~ the function selector ~~[[150]]~~ comprises a feed channel (151A) connected to the fluid feed pipe ~~[[54]]~~, a return channel (151B), a first outlet channel (151C) connected to a first branch pipe ~~[[152]]~~, and a second outlet channel (151D) connected to a second branch pipe ~~[[153]]~~, ~~in that the control valve (510, 610, 710, 810) for each of said at least one brake cylinder (100, 200, 300, 400) is cylinders being adapted to adopt two special mode positions (510B, 510C, 610B, 610C, 710B, 710C, 810B, 810C), respectively an antilock mode position and an antislip mode position, and comprises~~ a channel (511A) connected to the cylinder, a channel (511B) connected to the brake pipe, a channel (511C) connected to the first branch pipe, and a channel (511D) connected to the second branch pipe, and in that,

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in the antilock mode position (150B) of the selector [(150)], the return channel (151B) and the first outlet channel (151C) are connected together and the feed channel (151A) is isolated from them, in the antislip mode position (150A) of the selector [(150)], the feed channel (151A) and the second outlet channel (151D) are connected together and the return channel (151B) is isolated from them, and, in the normal braking position (610A, 610A, 710A, 810A) of the control valve (510, 610, 710, 810), the channel (511A) connected to the cylinder and the channel (511B) connected to the brake pipe [(44)] are connected together and the channels connected (511C, 511D) to the first and second branch pipes (152, 153) are isolated from them and from each other, in the antilock mode position (510B) of the control valve, the channel (511A) connected to the cylinder and the channel (511C) connected to the first branch pipe are connected together and the channel (511B) connected to the brake pipe and the channel (511D) connected to the second branch pipe are isolated from them, and, in the antislip mode position (510C) of said valve, the channel (511A) connected to the cylinder and the channel (511D) connected to the second branch pipe are connected together and the channel (511B) connected to the brake pipe and the channel (511C) connected to the first branch pipe [(152)] are isolated from them and from each other.

4. (currently amended) A system according to as claimed in claim 3, characterized in that wherein, in the antilock mode position (150B) of the function selector [(150)], the second outlet channel (151D) is connected to the return channel (151B) and, in the antislip mode position (150A) of the selector [(150)], the first outlet channel (151C) is connected to the return channel (151B).

5. (currently amended) A system according to any one of claims 1 to 4, characterized in that as claimed in claim 1, wherein the control valve (510, 610, 710, 810) for each brake cylinder includes double-acting pressure reducer means for adjusting the fluid pressure in the cylinder as a function of the operation of said valve.

6. (currently amended) A system according to any one of claims 3 to 5, characterized in that as claimed in claim 3, wherein the control valve (510, 610, 710,

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840) for each brake cylinder (100, 200, 300, 400) of said at least one brake cylinders passes through [[its]] the antilock mode position (540B, 640B, 740B, 840B) thereof on moving between [[its]] the normal braking position (540A, 640A, 740A, 840A) and [[its]] the antislip mode position thereof.

7. (currently amended) A system ~~according to any one of claims 1 to 6,~~ characterized in that as claimed in claim 1, wherein the antilock mode position (50B; 150B) of the function selector (50; 150) is an unoperated position of said selector towards which [[it]] the latter is urged at all times, whereas [[it]] said selector must be operated to move [[it]] from [[that]] said unoperated position to [[its]] the antislip mode position (50A; 150A).

8. (currently amended) A system ~~according to any one of claims 1 to 7,~~ characterized in that as claimed in claim 1, wherein the normal braking position (141A) of the control valve (110, 210, 310, 410; 510, 610, 710, 810) for each brake cylinder (100, 200, 300, 400) of said at least one brake cylinders is an unoperated position of [[that]] said valve towards which [[it]] the latter is urged at all times, whereas [[it]] said control valve must be operated to move it from [[that]] said unoperated position to [[its]] the at least one special mode position(s) position.

9. (currently amended) A system ~~according to any one of claims 1 to 8,~~ characterized in that it includes as claimed in claim 1, including at least one or more brake fluid accumulators (20, 22) accumulator adapted to be supplied by the source [[(10)]] of fluid under pressure and at least one or more brake valves (16, 18) valve adapted to be operated to connect the brake pipe (44, 46) to said accumulator.

10. (currently amended) A system ~~according to any one of claims 1 to 9,~~ characterized in that it as claimed in claim 1, including includes an antislip fluid accumulator [[(58)]] adapted to be supplied by the source [[(10)]] of fluid under pressure and to be connected to said fluid feed pipe [[(54)]] of the function selector (50; 150).

11. (currently amended) A system ~~according to any one of claims 1 to 10,~~

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~~characterized in that~~ as claimed in claim 1, wherein the fluid pressure in the fluid feed pipe ~~[(54)]~~ of the function selector ~~(50; 150)~~ is lower than ~~[(the)]~~ a pressure at which fluid is fed to the brake pipe ~~(44, 46)~~.

12. (currently amended) A system ~~according to claims 10 and 11, characterized in that~~ as claimed in claim 10, wherein the fluid pressure in the fluid feed pipe of the function selector is lower than a pressure at which fluid is fed to the brake pipe and the antislip fluid accumulator ~~[(58)]~~ is connected to the fluid feed pipe ~~[(54)]~~ via a pressure reducer ~~[(60)]~~.

13. (currently amended) A system ~~according to any one of claims 1 to 12, characterized in that it comprises~~ as claimed in claim 1, comprising means ~~(420, 220, 320, 420)~~ for sensing ~~[(the)]~~ a speed of each of said wheels, means ~~[(UC)]~~ for determining a target speed for each wheel, and means for comparing the sensed speed to said target speed and deducing therefrom the existence of wheelspin or of a wheel tending to lock.

14. (currently amended) A system ~~according to claim 13, characterized in that it comprises~~ as claimed in claim 1, comprising a control unit ~~[(UC)]~~ adapted, if wheelspin or a wheel tending to lock is deduced, to move the control valves ~~(410, 210, 310, 410, 510, 610, 710, 810)~~ between their the normal braking position ~~(410A, 210A, 310A, 410, 510A, 610A, 710A, 810A)~~ thereof and ~~[(their)]~~ the special mode position ~~(410B, 210B, 310B, 410B, 510B, 610C, 710B, 810B, 810C)~~ thereof as a function of the speeds of the wheels and their target speeds.

15. (currently amended) A system ~~according to any one of claims 1 to 14, characterized in that~~ as claimed in claim 1, wherein the function selector ~~(50; 150)~~ is adapted to be moved between ~~[(its)]~~ the antilock mode position ~~(50B; 150B)~~ and ~~[(its)]~~ the antislip mode position ~~(50A, 150A)~~ manually.

16. (currently amended) A system ~~according to~~ as claimed in claim 14, ~~characterized in that~~ wherein the control unit ~~[(UC)]~~ is adapted to move the function selector ~~(50; 150)~~ between ~~[(its)]~~ the antilock mode position thereof ~~(50B; 150B)~~ and

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[[its]] the antislip mode position (50A, 150A) thereof as a function of the speeds of the wheels and target speeds thereof.

17. (currently amended) A system ~~according to claims 15 and 16, characterized in that as claimed in claim 15, wherein~~ the control unit ~~[[UC]]~~ is adapted to move the function selector (50, 150) between ~~[[its]]~~ the antilock mode position (50B, 150B) and ~~[[its]]~~ the antislip mode position (50A, 150A) thereof as a function of ~~[[the]]~~ speeds of the wheels and ~~[[their]]~~ target speeds thereof for as long as said target speeds remain below a particular threshold value, whereas the function selector is adapted to be moved only manually from ~~[[its]]~~ the antilock mode position to ~~[[its]]~~ the antislip mode position if the target speeds exceed said threshold value.
18. (currently amended) An antislip and an antilock control valve for one or more wheels of a vehicle, ~~characterized in that it has~~ having a first channel (511A) connected to a brake cylinder, a second channel (511B) connected to a braking pressure source, a third channel (511C) connected to a pressure relief pipe, and a fourth channel (511D) connected to an antislip pressure source, ~~in that said control valve [[is]] being~~ a progressive valve that includes a movable member (520) ~~mobile~~ movable between a normal braking position (510A) in which the first and second channels (511A, 511B) are connected together and isolated from the third and fourth channels (511C, 511D), an antilock mode position in which the first and third channels (511A, 511C) are connected together and isolated from the second and fourth channels (511B, 511D), and an antislip mode position in which the first and fourth channels (511A, 511D) are connected together and isolated from the second and third channels (511B, 511C), ~~and in that it~~ wherein said valve includes means (521A, 521B, 534, 536) for varying ~~[[the]]~~ a communication area between the first and fourth channels (511A, 511D) in the antislip mode position as a function of the pressure in the first channel (511A) and for varying the communication area between the first and third channels (511A, 511C) in the antilock mode position as a function of the pressure in the first channel (511A).
19. (currently amended) A valve ~~according to as claimed in claim 18, characterized in that it includes~~ including means (521A, 521B) for establishing communication

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between the first and third channels (511A, 511C) when communication between the first and fourth channels (511A, 511D) is shut off from the antislip mode position and for establishing communication between the first and second channels (511A, 511B) when communication between the first and third channels (511A, 511C) is shut off from the antilock mode position.

20. (currently amended) A valve ~~according to as claimed in claim 18 or claim 19,~~ characterized in that it includes including an actuator ~~[[530]]~~ adapted to move the mobile movable member ~~[[520]]~~ in a first direction ~~[[F1]]~~ against a return force, in that wherein when the mobile movable member ~~[[520]]~~ is moved in said first direction ~~[[F1]]~~ from its antislip mode position the communication area between the first and fourth channels (511A, 511D) increases, and when said mobile movable member ~~[[520]]~~ is moved in said first direction ~~[[F1]]~~ from ~~[[its]]~~ the antilock mode position thereof, the communication area between the first and third channels (511A, 511C) decreases, and ~~in that it~~ wherein the valve includes a return control chamber ~~[[534]]~~ adapted to be connected in said antislip mode and antilock mode positions to the first channel (511A) of the valve so that the pressure in said chamber depends on the pressure in said first channel, the return control chamber having a mobile wall (534A) delimited by a surface of the mobile movable member and facing in the first direction ~~[[F1]]~~ and a fixed wall (536A) facing the mobile wall, so ~~[[that]]~~ said return control an increase in pressure in that chamber moves the mobile movable member in the direction opposite the first direction.

21. (currently amended) A valve ~~according to as claimed in claim 20,~~ characterized ~~in that wherein~~ there exists an intermediate antislip situation in which, when the mobile movable member ~~[[520]]~~ is moved in the first direction ~~[[F1]]~~, communication is established between the first and fourth channels (511A, 511D), whereas, when the mobile movable member is moved in the opposite direction ~~[[F2]]~~, communication is established between the first and third channels (511A, 511C), and ~~in that wherein~~ there exists an intermediate antilock situation in which, when the mobile movable member ~~[[520]]~~ is moved in said first direction ~~[[F1]]~~, communication is established between the first and third channels (511A, 511C), whereas, when the mobile movable member is moved in the opposite direction

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[(F2)], communication is established between the first and second channels (511A, 511B).

22. (currently amended) A valve ~~according to as claimed in claim 20 or claim 21,~~ characterized in that wherein the mobile movable member [(520)] is mobile in translation in a bore [(522)] comprising in succession in the first direction [(F1)] a braking orifice (522B) connected to the second channel (511B), a first orifice connected to the brake cylinder (522A) connected to the first channel (511A), an antislip orifice (522D) connected to the fourth channel (511D), a pressure relief orifice (522C) connected to the third channel (511C), and a second orifice connected to the brake cylinder (522A) connected to the first channel (511A), ~~in that wherein~~ the mobile movable [(520)] has a first groove (521A) adapted to connect the first orifice connected to the brake cylinder (522A) either to the brake orifice (522B) or to the antislip orifice (522D) according to the position of the mobile movable member [(522)], and a second groove (521B) adapted either to connect the pressure relief orifice (522C) to the second orifice connected to the brake cylinder (522A) or to isolate those two orifices from each other, according to the position of the mobile movable member.

23. (currently amended) A valve ~~according to as claimed in claim 22,~~ characterized in that wherein the second groove (521B) connects the return control chamber [(534)] to the second orifice (522A) connected to the brake cylinder in the antislip mode and antilock mode positions.

24. (currently amended) A valve ~~according to as claimed in claim 23,~~ characterized in that wherein the mobile movable member [(520)] has a transverse bore [(526)] that communicates with said second groove (521B) and delimits said mobile wall [(534A)] of the return control chamber.

25. (currently amended) ~~Valve according to~~ A valve as claimed in claim 24, characterized in that wherein the return control chamber [(534)] is delimited on the side opposite said mobile movable wall (534A) by the end (536A) of a needle [(536)] disposed in a longitudinal bore [(527)] of the mobile movable member

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[[520]] connected to the transverse bore [[526]].